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TWENTY-THIRD YEAR.

By FRANK P. MACLENNAN.

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Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Weather Indications.

CHICAGO, Feb. 29.—For Kansas: Generally fair tonight and Sunday; cold wave tonight; northerly winds.

PERHAPS Boss Platt's fall is a forerunner of what awaits him at St. Louis.

ALL the states which haven't "favorite sons" seem to be for McKinsley, as far as heard from.

IT is one thing to defeat Congressman Broderick for a re-nomination and another to elect the man that beats him.

STATESMEN differ. It is reported that Senator Forester cannot sleep. Ben Clover experienced no difficulty of that kind after he was elected.

ED HOWE once said that Major Anderson sang himself into the Topeka post-office. Perhaps his Modocs can sing him into the national convention.

THE silver wing of the Nebraska Democracy proposed to imitate Texas and submit the question of what kind of a delegation should go to Chicago to the voters at the primaries, but the goldbugs would not hear of it. Everywhere they appear to be afraid of the people.

SENATOR TELLER says he will not support the Republican candidate for president unless a satisfactory arrangement can be made about silver, and that he will never vote the Democratic ticket. This should be encouraging to the Populists.

APPARENTLY Jerry Simpson has an eye on the Populist nomination for governor. He will not run for congressman at large; he doesn't care for the nomination in the Seventh district; Harris doesn't want the nomination for governor; John Breidenbach won't have it; a Moses is needed, therefore—

IF the agitation of the subject of congressional funerals by Senator Peffer has stopped the extravagant attendant upon such occasions it has been productive of good results, even though his bill do not pass. The funeral trip of Congressman Crain is said to have been a very "dry" affair.

THE seating of Colonel Van Horn will give to the people of the Fifth Missouri district a congressman who will correctly represent their views on the most important question now before the public—the money question. They should congratulate themselves that they were not forced to wait until they could vote Tarsney out.

WALL street having called off the proposed war with England over the Venezuelan boundary, because it disturbed the stock market, it is now proposed to get into a squabble with Spain about Cuba. The present administration is very much in need of a war or something else to distract public attention from the contemplation of its misdeeds. A war at this time would insure the re-nomination of Cleveland and he has given abundant evidence that he will stop at nothing to gain his own ends.

THE Republicans and the Populists of Alabama have asserted for some years that the Democrats held control of that state by padding the election returns. The truth of their assertion seems to have been fully established since congress has ousted one of the Democratic congressmen and given the seat to a fusionist. There should be some way to dispossess the governor of the office which he doubtless holds through fraud.

BY opening the mints to silver its market price will rise to \$1.29 an ounce, which no one can honestly doubt, and if increasing the value of the thing by which other values are measured increases those values also, which cannot be denied, then the price of the commodities of silver-using countries can be doubled in the markets of the world by act of congress. If not, why not? To put it more clearly, if by act of congress it shall take a \$1.29 cent ounce of silver to buy a bushel of wheat instead of a 07 cent ounce of silver then the price of both wheat and silver have been doubled in the markets of the world and the United States being a large producer of both is one of the greatest gainers. Can the gold standard editors understand that?

AND A "COURT" DID IT.

Chicago Journal: Some low-down people who have not the entree into society may not relish the distinctions that came out in the trial, sentence, and imprisonment of Miss Elizabeth Flagler. Miss Flagler shot and killed a colored boy as he was stealing pears from a tree in her father's yard. She is a full-grown woman, but her act was that of a reckless and irresponsible child. Boys, white and colored, have invaded fruit trees from time immemorial in defiance of the law, but the toughest of old farmers have been content to punish them with profanity, a charge of fine salt fired from a shotgun, and the horse-whip. This society woman took a revolver and large, coarse bullets, without hesitation, and punished a peccadillo with death. It was not deliberate murder, of course. But there never was a clearer case of criminal recklessness.

For punishment she was fined \$500, driven to jail in a private carriage, and compelled to remain there three hours, with her aunt and father for company. Now, although the death of the Negro was accidental, it was not a joke, and somehow the carrying out of this jail sentence in such fashion makes it appear like a joke. It would have been far better to take the punishment out in the fine. There was no good in emphasizing so conspicuously the difference between the law's treatment of the rich and the poor.

It is that kind of thing that breeds anarchists.

In the speech of Mr. Calderhead, as printed in the Congressional Record is found the following passage:

Can American agricultural products be sold in any foreign market for more than other countries will sell them for? If Egypt will sell her cotton for 6 cents a pound and Argentina sells her wheat for 50 cents a bushel, can America sell her wheat or cotton for more? If not, how then would you raise the price of agricultural products?

Mr. Calderhead states an imaginary case. The fact is Argentina does not sell wheat for 60 cents. There has been little if any decline in the prices of cotton or wheat in any other country but ours, when measured in the money of those countries. An ounce of silver coined buys about the same quantity of those staples that it has done for many years. But the prices of these staples in this country have declined about one-half since 1873, because they are measured by the gold standard, while our silver is purchased by the same standard and exchanged in silver standard countries at its value there for wheat and cotton. Twelve cent cotton and \$1.29 cent wheat in Argentina, India, Egypt, Japan, China means 6 cent cotton and 60 cent wheat in the United States. European farmers are not affected because they do not produce these staples.

THE Pacific railroads owe the government \$189,000,000, principal and interest, or about three times what it cost to build and stock them. They pay no interest on this debt. The roads are mortgaged for \$25,000 a mile. The patrons of the road are taxed to pay interest on this latter debt. The government is now asked to accept new bonds, running 50 or 100 years at 2 per cent for its claim. Either the interest would not be paid or an additional tax would be laid on the patrons to meet it. It would be cheaper for the people to build a road to the Pacific and present it to somebody than to pay the extortionate rates which these roads must charge in order to make the earnings sufficient to pay interest on their obligations, although they pay none on the \$64,000,000 loaned them by the government. A better plan yet would be for the government to foreclose its mortgage, let the roads go to sale, take some of the \$202,000,000 proceeds of the bonds sold during this administration, which is now lying idle in the treasury, and buy them in. Then they could readily be leased to somebody for enough to pay interest on the government claim. Unless something of this sort is done the people will never see a cent for all the money and land which has been squandered on Huntington and his pals.

DIRT WILL FLY

On the Lower Dam, Worse Than It Has in the Johnson-Anderson Campaign.

Work on the lower dam has not been very active in the past few weeks. The injunction issued against the work had its effect.

"There has been some very good weather," said J. B. Bartholomew today, "but it is hardly certain. As soon as it is certain that we are to have good weather and not be interrupted by a storm and frozen ground, a large force will be put on immediately and the dam finished up. Sometime like 100,000 yards of dirt have already been moved."

"I do not know exactly how many men will be put to work, but it is safe to say several hundred, perhaps a thousand, will be at work in a short time. It is expected, if all things go well, to have the dam finished by July. The plant will be the very finest modern mechanics and money can give us."

The dam should have been almost finished by now. If it hadn't been for that foolish injunction it would have been. Topeka is full of people who would rather kill the town than keep it going, and of people who would rather stand by and see it and themselves struggle to raise a banner than do anything to help it. As a result of this spirit property here is not worth more than thirty per cent of what it was four years ago."

Pierson's Stock Company.

Owing to their immense popularity with Topeka theater goers the above company have canceled their date at Leavenworth, Kan., and play all of next week at the grand opera house. On Monday night ladies accompanied by one paid reserved seat ticket will be admitted free. Admission 10c, 20c, 30c. Seats now on sale at Sim's drug store.

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THE RAY OF MYSTERY.

Development of Roentgen's Discovery.

ITS USES AND POSSIBILITIES.

Photographs Made Through Metals Two Years Ago.

Its Peculiar Properties Were All Set Forth to the Scientific World Early in 1894. Not Much Better Understood Now Than It Was Then—The Part Tesla's Converter Plays in Recent Experiments.

[Copyright, 1896, by the Author.]
NEW YORK, Feb. 28.—Probably no such popular future for a purely scientific discovery was ever excited before as has grown out of the exploitation of the new photography with the aid of the X ray, or Roentgen ray, as it is popularly known. How many intelligent and well educated men and women know, or knew a month ago, what a cathode is or was?

Yet the name cathode dates back to the time of Faraday, 1833.

The cathode ray has been known for more than 15 years.

Photography with the cathode ray is more than two years old. In view of the excitement created all over the world by the experiments made by scientists in the last two months, these facts seem remarkable. They are beyond question, though, and I have seen the pictured results of cathode photography, the product of the experiments of Professor Philipp Lenard of Germany, published in March, 1894. Lenard's discoveries awakened the scientific world to investigation. Roentgen was one of the investigators. It happened to be the good fortune of Roent-



PROFESSOR ROENTGEN.

gen to discover the means of making a popular application of the discovery of Lenard and of Lenard's predecessors—Crookes, Hittorf and others. For this reason Roentgen is a popular hero and Lenard is ignored. But the scientific world gives Lenard the credit which is his due, and if he is not a person of narrow mind he is, no doubt, content with that.

Nikola Tesla, who believes he came very near a somewhat similar discovery, smiles when he speaks of the public excitement over the cathode photography and says everything will find its place when history is written. Mr. Tesla has a large interest even now in the development of the famous discovery, for the Tesla converter is used universally to reduce those powerful rays with which Roentgen was able to accomplish what would have been impossible to Lenard without the Tesla apparatus. In fact, but for Tesla's invention there would have been no photographing of the bones of the hand. Lenard never got beyond the point of making the rays penetrate pieces of metal foil.

If you have ever been in a scientific class and studied electricity, you know the Leyden jar, with its brass knob, from which sparks of electricity pass when it is brought close to a conductor, provided the jar is charged. This is static electricity, or electricity which can be produced by ordinary friction. It was the first electricity known. Probably also you remem-



NIKOLA TESLA.

ber the tube in which electricity was made to pass from the positive to the negative pole of an interrupted circuit through a partial vacuum. The operation was accomplished with a brilliant display of colored lights, suggesting a fireworks show in miniature. The jar charged with static electricity and the vacuum tube are the foundation of the cathode photography. Faraday gave the title "anode" to the positive pole, and "cathode" to the negative pole.

Between Hittorf and Crookes lies the credit of the discovery that from the cathode as well as from the anode in the vacuum tube proceed a ray. For nearly half a century the cathode had been appar-

ently the receptacle, the anode the producer and disseminator, of light. In the brilliant rays which streamed from the positive pole the negative pole was thrown completely in shadow until Hittorf and Crookes almost simultaneously discovered that it, too, propagated a ray.

Crookes' Achievements.

Crookes' achievements in the direction of producing a vacuum resulted in the Crookes tubes which have become famous popularly as well as scientifically of late because of their use in cathode photography. It was in one of his vacuum tubes that Crookes hunted down the cathode ray, or, as a recent scientific writer puts it, "vitalized" the ray for the benefit of the Royal Society and the British Association in 1878. In the scientific world the discovery was regarded as of grave importance, and the scientific journals made much of it. But if there was any mention of it in the daily or weekly newspapers it must have been very brief, and to the reader of unscientific mind must have seemed very uninteresting, for who, by the widest stretch of the imagination, could have associated the fact that a ray of some kind, imperceptible to the eye under ordinary conditions, proceeded from the negative pole of a vacuum tube with the possibility of photographing the human brain? Certainly Crookes did not, and it was not until 1891 that the discovery was made that these peculiar rays would penetrate solids. Wiedemann and Ebert noticed in that year that gold leaf coatings on vacuum tubes were transparent to the cathode rays.

This fact, being made known to the scientific world, was developed by the late Professor Hertz, whose assistant was Professor Philipp Lenard. Professor Lenard became deeply interested in this peculiar property of the cathode ray and made earnest efforts to classify the ray, forming a theory that it was of ethereal nature and bearing his experiments on that idea. Up to the time of his experiments the rays had been studied only in the vacuum. The glass of the vacuum tube seemed impervious to them. Professor Lenard wanted to get them into the air. With other scientific men, he believed that they could not be led through glass, and he did not know that they would pass into the air, but their ability to penetrate metal seemed to offer a means of leading them without the tube. Professor Hertz suggested the use of an aluminium window to bring the

waves of electrified air," photography through opaque substances might have been known before, for Nikola Tesla tells me he has found that these "sound waves of electrified air" will make impressions on dry plates like the cathode rays.

But sound waves are not supposed to take photographs, and it would have been beyond all reason to expect it of them. The cathode rays illuminated very faintly, but perceptibly. It was natural for the experimenter to test their effect on the photographic plate and on sensitive paper for the purpose of creating an analogy between them and the rays of light which come to us as illuminants, but which, unlike the cathode rays, will not pass through opaque substances.

The cathode ray was not light, but it produced this one effect of light at least—it decomposed the chemicals on the dry



SHADOWGRAPH.

[From one of Roentgen's own negatives showing hand with rings on one finger.]
plate. If the cathode waves would do this, why would not the "sound waves of electrified air"? The Roentgen experiments with the cathode rays showed that the rays were produced in unexampled strength by the use of the Tesla converter, through whose discharges the "electrified air" waves were produced. So Mr. Tesla very naturally tried the effect of his "sound waves of electrified air," with the result of which I have told. He was the first to photograph the human brain, and though he does not consider the photograph a success he expects to improve on it. In fact, he tells me he is progressing with his experiments rapidly to the point where he hopes to take instantaneous pictures with the new ray. Up to this time the best results have been obtained with exposures of an hour or more.

Lenard's experiments with the cathode ray stirred up the scientific world mightily. He not only demonstrated the possibility of bringing the new rays through metals, but brought them through glass. The glass was thin, though—thinner than had been used in prior experiments. Roentgen, as I have said, went one step beyond Lenard. He discovered a method of intensifying the ray so that it would pass through plates of metal as well as metal foil, through blocks of wood and other thick, opaque substances. This gave the discovery its practical value—its value in surgery and other fields, in which efforts are being made to apply it now. Roentgen is entitled to all credit for his development of the ray's uses. But before him others deserve some credit, and not the least among these is Nikola Tesla, whose converter is the medium through which all the successful results have been obtained.

The ray has not been classified yet. Lenard believes it is ethereal. So does Roentgen. Tesla hopes it is a longitudinal sound wave. If it is ethereal, he says, its sphere of usefulness is limited. It will probably never penetrate very great thicknesses. If it is a sound wave, it can go almost anywhere—through a brick wall or an iron safe.

Many Experimenters at Work.
Hundreds of American scientists are busily at work on the Lenard-Roentgen discovery. They regret that Tesla or Edison did not bring the credit of the American, but they are no less enthusiastic on that account. They have determined that some good shall come out of America in connection with the discovery, and they are sitting up nights experimenting. If the exact nature of the ray could be determined, they could work more intelligently, but they are no worse off in this respect than are the scientists of Germany and England. So they are groping about, hoping in most cases that they may hit on something by accident. Edison began the practical side of the business, as was natural. Demonstrations of new scientific facts appeal to Edison most when he can see some means of applying them to the work of man. So the first thing to which Edison turned his mind was the invention of some means of producing the new rays without the use of the expensive Crookes tube. Tesla began to work out a means of taking pictures instantaneously by the new photography, and he has been engaged in trying to classify the ray. Other scientists have devoted their attention especially to developing in the ray the re-frangibility of the ray of light. All have repeated the spectacular experiments now abroad—photographing the bones of the living hands, etc.

It would seem now to the unscientific mind as though two things were most immediately important—to concentrate the rays and increase their penetrating power. A third result to be attained by long and exhaustive experiments is to prove what substances are transparent to the rays and in what degree. But the American who proves the possibility of taking a direct photograph instead of a shadow photograph with the new rays will have his name linked with that of Lenard and Roentgen.

Now all that can be accomplished with the new photography is to cast the shadow of an opaque substance on the sensitive plate. When the cathode rays are propagated through the hand, they find the flesh and blood and skin transparent, but the bones are opaque. So the outline of the bones is traced on the sensitive plate. This has its value in surgery, and already bullets and other foreign substances have been located in man's hands by the new photography. But it will reach a higher stage of usefulness when the surface of the bone can be photographed through the flesh. Possibly before this written word sees type that wonder, too, will be developed.

Surgery seems likely to benefit most by the new science. It has been suggested that it can be used to detect flaws in metal plates. Edison and others have suggested that, as powerful rays of light kill bacilli, the new ray might be specific in some diseases. This seems fantastic, yet nothing would have seemed more fantastic to the mind of the average man a year ago than the suggestion that his skeleton could be photographed before he died.

GEORGE GRANTHAM BAIN.



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